

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference DE920020032 | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416) | |
| International application No. PCT/EP 03/1512 | International filing date (day/month/year) 17.10.2003 | Priority date (day/month/year) 20.12.2002 |
| International Patent Classification (IPC) or both national classification and IPC G01R33/18 | | |
| Applicant INTERNATIONAL BUSINESS MACHINES CORPORATION et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:
- I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

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| Date of submission of the demand 09.06.2004 | Date of completion of this report 07.09.2004 |
| Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div> | Authorized Officer Böhm-Pélissier, A Telephone No. +49 89 2399-2495 |



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/11512**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-11 as originally filed

Claims, Numbers

1-6 as originally filed

Drawings, Sheets

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|-----|
| Novelty (N) | Yes: Claims | 1-6 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | 1-6 |
| | No: Claims | |
| Industrial applicability (IA) | Yes: Claims | 1-6 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Citations:

- D1: BARIL L ET AL: "MAGNETOSTRICTION IN SPIN VALVES" JOURNAL OF APPLIED PHYSICS, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, vol. 85, no. 8, PART 2A, 15 April 1999 (1999-04-15), pages 5139-5141, XP000823729 ISSN: 0021-8979
- D2: ALI M ET AL: "Measurement of saturation magnetostriction using novel strained substrate techniques and the control of the magnetic anisotropy" JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS, ELSEVIER, AMSTERDAM, NL, vol. 202, no. 1, June 1999 (1999-06), pages 85-94, XP004363938 ISSN: 0304-8853
- D3: "MAGNETOSTRICTION MAPPING OF SOFT MAGNETIC FILMS ON THICK RIGID SUBSTRATES" IBM TECHNICAL DISCLOSURE BULLETIN, IBM CORP. NEW YORK, US, vol. 33, no. 8, 1991, pages 126-127, XP000107018 ISSN: 0018-8689

2. Article 33(2) PCT (novelty)

The technical feature of claim 1 that the alternating field is both perpendicular to the substrate and parallel to the magnetoresistive layers is 1.) contradictory to the drawings (y-axis in perspective view) and 2.) physically senseless, since the layers/thin films are in general on (=parallel to) the substrate.

Therefore, as basis for the examination it is assumed that the alternating field is perpendicular to the magnetic DC field and not to the substrate.

D1, which is considered to represent the closest prior art, discloses a method for measuring the magnetostriction constant of a magnetoresistive element by: providing a substrate carrying one or more magnetoresistive elements, inserting said substrate into a bending fixture (Fig. 1), applying a magnetic DC field parallel to said substrate (Fig. 2), applying a (transverse) magnetic field perpendicular to said magnetic DC field and parallel to the magnetoresistive layers of said elements (Fig. 2), measuring a signal from said element (Fig. 2) and applying a mechanical stress parallel to said substrate by bending said substrate (Fig. 1); cf abstract, Figs. 1 and 2, pages 5139-5140.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP 03/11512

D1 does not disclose 1) the step of changing said magnetic DC field until the signal measured before applying said mechanical stress is reached and 2) that the transverse field is an alternating field.

Consequently, the subject matter of claim 1 and its dependent claims is novel.

3. Article 33(3) PCT (inventive step)

Nothing in D1-D3 teaches to apply an alternating field instead of a static transverse field and to measure the magnetostriction directly by compensating the signal change caused by the stress.

Consequently, the subject matter of claim 1 and its dependent claims is inventive.